

IN THE CLAIMS:

Please substitute the following claims for the same-numbered claims in the application:

1-28. (Cancelled).

29. (Currently Amended) A method for dynamically developing a marketing strategy to address at least one specified merchant objective, the objective corresponding to a specified time period and a specified budget, the strategy being implemented across at least one marketing channel, the strategy including at least one initiative, the method comprising the steps of:

- a. generating a plurality of marketing strategies;
- b. determining an optimal marketing strategy based on a state of a customer and constraints corresponding to marketing channels, such that said state of a customer comprises a purchase frequency and a monetary value of purchases, and such that said constraints comprise costs of said marketing channels, effectiveness of said marketing channels, and customer preferences for said marketing channels, wherein said determining of said optimal marketing strategy comprises identifying all possible states of customers, and wherein said identifying of said all possible states of customers comprises identifying all relevant attributes of customers, and partitioning said customers into partitions based on identified attributes using a similarity measure based on a historic

policy, actual rewards and transition probabilities from one data point to another, said partitions forming new states of said customers;

- c. deploying the determined optimal marketing strategy;
- d. recording customer response to the deployed optimal marketing strategy;
- e. updating information corresponding to the state of a customer based on the recorded customer response; and
- f. repeating steps b to e for the specified time period.

30. (Currently Amended) The method as recited in claim 29, all the limitations of which are incorporated herein by reference, wherein the step of generating a plurality of marketing strategies comprises the steps of:

selecting at least one initiative that enables an addressing of the specified objective;

determining sequences in which selected initiatives ~~can be~~ are deployed, if more than one initiative is selected; and

combining the selected initiatives in the determined sequences to obtain the plurality of marketing strategies.

31. (Currently Amended) The method as recited in claim 30, all the limitations of which are incorporated herein by reference, further comprising varying parameters of initiatives to generate new initiatives.

32. (Currently Amended) The method as recited in claim 30, all the limitations of which are incorporated herein by reference, further comprising varying deployment time of initiatives.

33. (Currently Amended) The method as recited in claim 29, all the limitations of which are incorporated herein by reference, wherein the step of determining an optimal marketing strategy further comprises the steps of:

- ~~determining all possible states of customers;~~
- determining an optimal policy for each state based on past data;
- identifying the state of a customer, the customer visiting a merchant or the customer being selected from a database of customers; and
- identifying an optimal marketing strategy using the state of the customer, the identified optimal policy and constraints corresponding to marketing channels.

34. (Cancelled).

35. (Currently Amended) The method as recited in claim 33, all the limitations of which are incorporated herein by reference, wherein the step of determining the optimal policy for each state based on past data comprises the steps of:

- identifying a deterministic policy;
- initializing a value of all possible states for the policy;
- computing the value of a state for the policy;

repeating said step of computing for all possible states;
constructing a new improved policy;
iteratively performing steps of computing, repeating, and constructing until the new improved policy remains unchanged for two subsequent iterations; and
selecting the policy with maximum value for the state as the optimal policy for the given state.

36. (Currently Amended) The method as recited in claim 35, all the limitations of which are incorporated herein by reference, wherein the step of computing the value of a state for the policy comprises the steps of:

computing transition probabilities from a given state to another state for the policy;
computing value of expected immediate reward for the policy in the state;
computing discounted expected value of a resulting state for the policy; and
computing a sum of expected immediate reward and the discounted expected value.

37. (Currently Amended) The method as recited in claim 35, all the limitations of which are incorporated herein by reference, wherein the step of constructing a new improved policy comprises the steps of:

selecting the marketing strategy which maximizes a value for the state over all marketing strategies for a given state; and

repeating said step of selecting for each state.

38. (Currently Amended) The method as recited in claim 33, all the limitations of which are incorporated herein by reference, wherein the step of identifying an optimal marketing strategy comprises the steps of:

- identifying the optimal policy for an identified customer state;
- modeling customer's preferences for marketing channels, cost and effectiveness of different marketing channels, and the specified budget as effective constraints;
- determining an optimal feasible policy based on the identified optimal policy and effective constraints corresponding to marketing channels; and
- determining the optimal marketing strategy from the optimal feasible policy.

39. (Currently Amended) The method as recited in claim 38, all the limitations of which are incorporated herein by reference, wherein the step of determining an optimal feasible policy based on effective constraints corresponding to marketing channels comprises mapping the optimal policy uniquely to a closest feasible optimal policy based on the effective constraints, if the effective constraints are not satisfied by the optimal policy.

40. (Currently Amended) The method as recited in claim 29, all the limitations of which are incorporated herein by reference, wherein the step of updating information

corresponding to the state of a customer based on the recorded customer response comprises the steps of:

- identifying a resulting state of the customer;
- updating values of the state of the customer; and
- updating an optimal policy.

41. (Currently Amended) The method as recited in claim 40, all the limitations of which are incorporated herein by reference, wherein the step of updating the values of the state of the customer comprises:

- computing a sum of a new immediate reward, a discounted value corresponding to the resulting state, reduced by a value corresponding to an initial state of the customer;
- updating the values corresponding to the initial state of the customer by adding a fraction of the computed sum to a value of a previous state of the customer; and
- propagating a change in the value of the state to all other states.

42. (Currently Amended) The method as recited in claim 40, all the limitations of which are incorporated herein by reference, wherein the step of updating the optimal policy comprises:

- computing a sum of a new immediate reward, a discounted value corresponding to the resulting state, reduced by a value corresponding to an initial state of the customer;
- and

updating the optimal policy corresponding to an initial state of the customer by adding a fraction of the computed sum to the value of a previous state of the customer.

43. (Currently Amended) A system for dynamically developing a marketing strategy to address at least one specified merchant objective, the objective corresponding to a specified time period and a specified budget, the strategy being implemented across at least one marketing channel, the strategy including at least one initiative, the system comprising:

a generator operable for generating a plurality of marketing strategies;

a first unit operable for determining an optimal marketing strategy based on state of a customer and constraints corresponding to marketing channels, such that said state of a customer comprises a purchase frequency and a monetary value of purchases, and such that said constraints comprise costs of said marketing channels, effectiveness of said marketing channels, and customer preferences for said marketing channels;

a first sub-unit operable for determining all possible states of customers, wherein said identifying of said all possible states of customers comprises identifying all relevant attributes of customers, and partitioning said customers into partitions based on identified attributes using a similarity measure based on a historic policy, actual rewards and transition probabilities from one data point to another, said partitions forming new states of said customers;

a second unit operable for deploying the determined optimal marketing strategy;

a recorder operable for recording customer response to the deployed optimal marketing strategy; and

a third unit operable for updating information corresponding to the state of a customer based on the recorded customer response.

44. (Currently Amended) The system as recited in claim 43, all the limitations of which are incorporated herein by reference, wherein said generator comprises:

a selector operable for selecting at least one initiative that enables an addressing of the specified objective;

a first sub-unit operable for determining sequences in which selected initiatives ~~can be~~ are deployed, if more than one initiative is selected; and

a second sub-unit for combining the selected initiatives in the determined sequences to obtain the plurality of marketing strategies.

45. (Currently Amended) The system as recited in claim 43, all the limitations of which are incorporated herein by reference, wherein the first unit comprises:

~~a first sub-unit operable for determining all possible states of customers;~~

a second sub-unit operable for determining an optimal policy for each state based on past data;

a third sub-unit operable for identifying the state of a customer, the customer visiting a merchant or the customer being selected from a database of customers;

a fourth sub-unit operable for identifying the optimal policy for an identified customer state;

a fifth sub-unit operable for modeling customer's preferences for marketing channels, cost and effectiveness of different marketing channels, and the specified budget as effective constraints;

a sixth sub-unit operable for determining an optimal feasible policy based on effective constraints corresponding to marketing channels; and

a seventh sub-unit operable for determining the optimal marketing strategy from the optimal feasible policy.

46. (Currently Amended) The system as recited in claim 45, all the limitations of which are incorporated herein by reference, wherein the second sub-unit comprises:

a first component operable for identifying a deterministic policy;

a second component operable for initializing a value of all possible states for the policy;

a third component operable for computing the value of a state for the policy;

a fourth component operable for constructing a new improved policy;

a fifth component operable for iteratively implementing said third component and said fourth component; and

a sixth component operable for selecting the policy with maximum value for the state as the optimal policy for the given state.

47. (Currently Amended) The system as recited in claim 46, all the limitations of which are incorporated herein by reference, wherein the fourth component comprises a selector operable for selecting the marketing strategy that maximizes a value for the state over all marketing strategies for a given state.

48. (Currently Amended) The system as recited in claim 43, all the limitations of which are incorporated herein by reference, wherein the third unit comprises:

- a first sub-unit operable for identifying a resulting state of the customer;
- a second sub-unit operable for updating a values of the state of the customer; and
- a third sub-unit operable for updating an optimal policy.

49. (Currently Amended) A program storage device readable by computer, tangibly embodying a program of instructions executable by the computer to perform a method for dynamically developing a marketing strategy to address at least one specified merchant objective, the objective corresponding to a specified time period and a specified budget, the strategy being implemented across at least one marketing channel, the strategy including at least one initiative, the method comprising:

- generating a plurality of marketing strategies;
- determining an optimal marketing strategy based on state of a customer and constraints corresponding to marketing channels, such that said state of a customer comprises a purchase frequency and a monetary value of purchases, and such that said constraints comprise costs of said marketing channels, effectiveness of said marketing

channels, and customer preferences for said marketing channels, wherein said determining of said optimal marketing strategy comprises identifying all possible states of customers, and wherein said identifying of said all possible states of customers comprises identifying all relevant attributes of customers, and partitioning said customers into partitions based on identified attributes using a similarity measure based on a historic policy, actual rewards and transition probabilities from one data point to another, said partitions forming new states of said customers;

deploying the determined optimal marketing strategy;
recording customer response to the deployed optimal marketing strategy; and
updating information corresponding to the state of a customer based on the recorded customer response.

50. (Currently Amended) The program storage device as recited in claim 49, all the limitations of which are incorporated herein by reference, wherein the step of generating a plurality of marketing strategies comprises:

selecting at least one initiative that enables an addressing of the specified objective;

determining sequences in which selected initiatives ~~can be~~ are deployed, if more than one initiative is selected; and

combining the selected initiatives in the determined sequences to obtain the plurality of marketing strategies.

51. (Currently Amended) The program storage device as recited in claim 49, all the limitations of which are incorporated herein by reference, wherein the step of

determining an optimal marketing strategy comprises:

- ~~determining all possible states of customers;~~
- determining an optimal policy for each state based on past data;
- identifying the state of a customer, the customer visiting a merchant or the customer being selected from a database of customers;
- identifying the optimal policy for an identified customer state;
- modeling customer's preferences for marketing channels, cost and effectiveness of different marketing channels, and the specified budget as effective constraints;
- determining an optimal feasible policy based on effective constraints corresponding to marketing channels; and
- determining the optimal marketing strategy from the optimal feasible policy.

52. (Currently Amended) The program storage device as recited in claim 51, all the limitations of which are incorporated herein by reference, wherein the step of

determining the optimal policy for each state based on past data comprises:

- identifying a deterministic policy;
- initializing a value of all possible states for the policy;
- computing the value of a state for the policy;
- constructing a new improved policy;
- iteratively executing said steps of computing and constructing; and

selecting the policy with maximum value for the state as the optimal policy for the given state.

53. (Currently Amended) The program storage device as recited in claim 52, all the limitations of which are incorporated herein by reference, wherein the step of constructing a new improved policy comprises selecting the marketing strategy that maximizes a value for the state over all marketing strategies for a given state.

54. (Currently Amended) The program storage device as recited in claim 49, all the limitations of which are incorporated herein by reference, wherein the step of updating information corresponding to the state of a customer based on the recorded customer response comprises:

- identifying a resulting state of the customer;
- updating values of the state of the customer; and
- updating an optimal policy.

55. (Currently Amended) A system suitable for developing an optimal marketing strategy, the system comprising:

- a database storing information regarding initiatives that ~~can be~~ are offered to customers, marketing channels available for executing the initiatives, cost and effectiveness of the marketing channels, and states of customers;

a unit operable for enabling a merchant to specify at least one objective for a specified time period;

a generator operable for generating a plurality of marketing strategies based on the objective specified by the merchant, the marketing strategies being a combination of initiatives; and

a component operable for determining the optimal marketing strategy and at least one marketing channel based on a state of a customer and cost and effectiveness of marketing channels, such that said state of a customer comprises a purchase frequency and a monetary value of purchases, wherein said determining of said optimal marketing strategy comprises identifying all possible states of customers, and wherein said identifying of said all possible states of customers comprises identifying all relevant attributes of customers, and partitioning said customers into partitions based on identified attributes using a similarity measure based on a historic policy, actual rewards and transition probabilities from one data point to another, said partitions forming new states of said customers.

56. (Currently Amended) A method for dynamically developing a marketing strategy to address at least one specified merchant objective, the objective corresponding to a specified time period and a specified budget, the strategy being implemented across at least one marketing channel, the strategy including at least one initiative, the method comprising the steps of:

a. generating a plurality of marketing strategies;

- b. determining all possible states of customers, such that said states of customers comprise a purchase frequency and a monetary value of purchases;
- c. determining an optimal policy for each state based on past data;
- d. identifying the state of a customer, the customer visiting a merchant or the customer being selected from a database of customers;
- e. identifying the optimal policy for an identified customer state;
- f. modeling customer's preferences for marketing channels, cost and effectiveness of different marketing channels, and the specified budget as effective constraints;
- g. determining an optimal feasible policy based on the identified optimal policy and effective constraints corresponding to marketing channels;
- h. determining an optimal marketing strategy from the optimal feasible policy, wherein said determining of said optimal marketing strategy comprises identifying all relevant attributes of customers, and partitioning said customers into partitions based on identified attributes using a similarity measure based on a historic policy, actual rewards and transition probabilities from one data point to another, said partitions forming new states of said customers;
- i. deploying the determined optimal marketing strategy;
- j. recording customer response to the deployed marketing strategy;
- k. identifying a resulting state of the customer;

- l. updating values of the state of the customer;
- m. updating the optimal policy; and
- n. repeating steps c to m for the specified time period.